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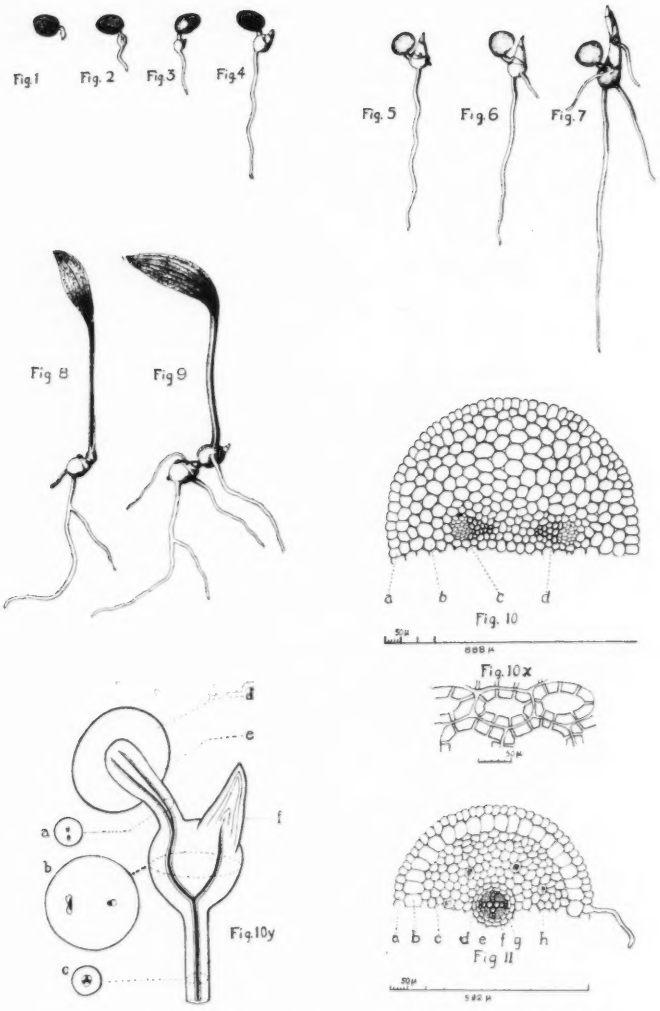
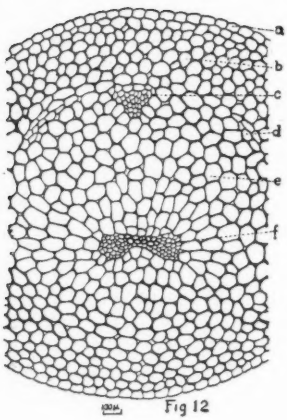


PLATE I. VOGT ON POLYGONATUM COMMUTATUM.



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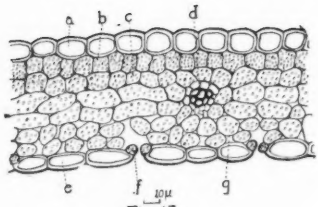

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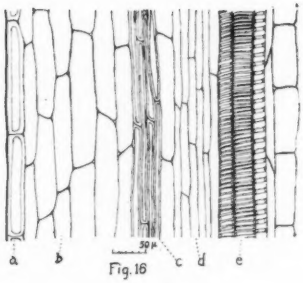

Fig. 16

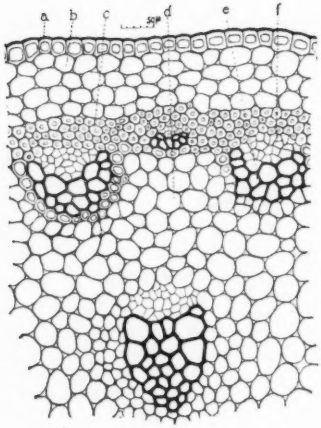

Fig. 17

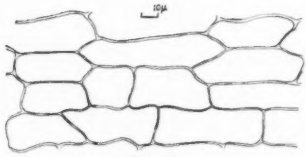

Fig. 14

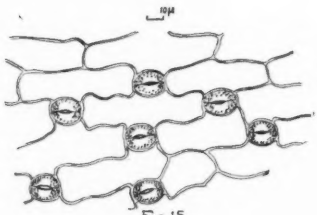

Fig 15

PLATE II. VOGT ON POLYGONATUM COMMUTATUM.

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THE ECOLOGY AND ANATOMY OF POLYGONATUM COMMUTATUM.

BY RICHARD VOGT.

On account of its remarkably slow growth the plant which forms the subject of the following notes was expected to show peculiarities of both ecology and structure. The absence also of seedlings readily to be found by the superficial observer led us to seek more carefully for such specimens. As a result of these investigations we obtained what seemed to us rather interesting facts regarding the habits and the anatomy of the plant in various stages of development.

HISTORY.

The genus *Polygonatum*, to which the plant we have studied belongs, was first named by the Greek Dioscorides,[1] a contemporary of Pliny. The plants were recognized by the name *Polygonatum* by nearly all pre-Linnaean authors as will be seen in the accompanying list of synonyms. Some of the older authors using one worded names for genera took the common vernacular one corresponding to Solomon's Seal and called the plant *Sigillum Salamonis:* e. g., Brunfels, Gesner, and Tragus. Anguillara and Caesalpinus called the type plant of the genus *Frasinella.* Heister[2] rejected all older names and substituted the name *Salamonia* in honor of King Solomon. Linnaeus[3] did not recognize the genus of the ancients but referred the plants to his newly made genus *Convallaria* of which the lily-of-the-valley was the type. The plant on which Dioscorides founded the genus, and which since Linnaeus is still considered the type of the genus *Polygonatum*, is *Convallaria Polygonatum*, Linn. As early as 1549

[1] Dioscorides, Mat. Med. 4 : 5. [2] Heister, Syst. 5 (1748).

[3] Linnaeus, C., Sys. 1753); Gen. p. 96 (1737); p. 148 (1754); Sp. —Pl. p. 314 (1753).

this plant had been called by Fuchs[4] by the correct and generally admitted binary name *Polygonatum latifolium.* As early as the fifteenth century and perhaps much earlier the plants were called Weiszwurz by the Germans, because of the characteristic white roots. All of the other contemporaneous European vernacular names were translations of the Latin *Sigilium Salamonis* or Soloman's Seal. Caspar Bauhin[5] explains the name as well as the Dioscorean one: "*quod radix crebro geniculata sit*" because the root is much geniculate "*Vulgo Sigillum Salamonis haud dubie a vestigiis pluribus radici sigilli instar impressis,*" "commonly Solomon's Seal doubtless because of the many (stem) traces impressed upon the root like a seal." Leonhard Fuchs[6] also had aptly accounted for the name nearly one hundred years before: "*Polygonatum Latinis dicitur. Officinis, item herbariis and vulgo Sigillum Salamonis, Germanis Weiszwurz (Gallis, signet de Salamo) hoc est radix alba nominatur. Polygonatum autem a radici geniculorum frequentibus nodis ex intervallis tumente appellaverunt.*" "(The plant) is called by the Latins *Polygonatum;* in the shops and by herbarians commonly Solomon's seal; by the Germans, Weiszwurz, that is, white root. *Polygonatum* they called it from the roots swelling at frequent intervals with bends and nodes."

In our region the genus is represented by two species *P. biflorum* Walt. Ell. and *P. commutatum* R. and S. The latter is the subject of this article. *P. commutatum* was first differentiated as a species from both European and other American members of the genus by Schulte under the name *Convallaria commutata.* Unaware of this publication Dietrich[8] had published this plant as new under the name *P. giganteum* by which it was known until recently in some of our common American manuals. Later he admitted the priority of P. *commutatum* as a specific name.[9]

The following is a resumé of the synomymy of the generic and specific names.

POLYGONATUM. Dioscorides, Mat. Med. 4:5.

Also *Polygonatum,* Matthioli, Lacuna, Castor Durante,

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[4]Fuchs, L., Primi de Stirpium Historia, p. 336 (1549).
[5]Bauhin, C., Pinax, p. 303 (1623).
[6]Fuchs, L. de Historia Stirpium, p. 199 b (1546).
[7]R. and S. Sept. 7., p. 1671 (1830).
[8]Otto and Dietr. Gartenz. 3 : 322 (1835).
[9]Otto and Dietr., Gartenz. 3 : 223 (1835).

Comerarius, Fuchs, Dodonaeus, Cordus, Gesner, Lobelius, Tabernaemontanus, Gerard, Lonicer, Cusa, Thalius, Clusius, Turner, Caesalpinus, and Bauhin. Tour., Els. p. 69 (1694); I. R. H., p. 78 (1700); Hill, Br. Herb. p. 320 (1756); Zinn., Cat. Pl. p. 59 (1760); Morandi, Hist. Bot. Pract. p. 105 (1761); Adanson, Fam. des Pl. p. 54 (1753). *Sigillum Salamonis.* Brunfels, Gesner, Tragus. *Convallaria.* Linn., Syst. (1735); Gen. p. 96 (1737), 148 (1754); Sp. Pl. p. 314 (1753) *Axillaria.* Raf., Jour. Phys. 89: p. 261 (1819). Am Month. Mag. 266, (1818).

Polygonatum commutatum. (R. and S.) Dietr., Gartenz. 3, p. 223 (1835).

P. giganteum l. c. p. 322. *Convallaria commutata* R. and S. Syst. 7, p. 1761 (1830).

ECOLOGY OF THE SEEDLING.

The young seedlings of the plant were found to be very common during the past summer at several places near South Bend, and an opportunity was thus afforded of studying them under natural conditions. They seem to thrive best in a well drained sandy soil with plenty of vegetable mold and in a position where they will be mulched and protected but not much shaded by surrounding trees.

The mature plant with its berries, after wilting or drying up, falls to the ground sometime in October, and the berries are soon covered with fallen leaves and other debris. In this state they soon rot leaving the seeds entirely embedded. The seeds themselves are somewhat roughly spherical in shape and about three millimeters in diameter; at first of a pale yellow collor with a brownish scar, they later become a dingy brown throughout. The bulk of the seed is found to be made up of endosperm food storage tissue of a horny consistency and composed of rather large cells, having thick and regular food deposits on the inner surface of their walls, and communicating with each other by numerous small canals (Fig. 10x). These seeds lie dormant during the fall and winter and germinate about the last of May or in early June, although they may sometimes be much retarded.

In germination the embryo breaks through the seed coat at a point about opposite the scar, and there are pushed out in succession; first the radical or primary root, next the hypocotyl which is soon slightly enlarged, and last the petiole of the coty-

ledon (Figs. 1 and 2.) (All drawings of the seedling are natural size.) The cotyledon itself remains inside the seed to act as an organ of absorption. The primary root now strikes downward into the soil and may attain a length of about five centimeters the first summer (Figs. 2 to 7.) Meanwhile the hypocotyl gradually increases in diameter, and a slit opens in its side through which the epicotyl or plumule first appears as a small conical bud (figs. 2 and 3). The epicotyl pushes out through this slit and grows to a length of about one centimeter during the first season, bearing usually two or three membranous leaf scales, and at its base one or two secondary roots (Figs. 4 to 7). In none of the many seedlings observed did the epicotyl produce a green leaf the first year, but in all cases the plant remained entirely underground until the second spring. It will be seen therefore that the plant, having no green leaves, can produce no new organic material but is dependant until the second summer on that stored in the seed. Such of this food material, however, as is not used in the first season's growth does not apparently remain in the seed, but is passed downward through the cotyledon and its petiole into the hypocotyl, where it is stored in a form probably far more readily available than the horny endosperm of the seed. This transfer is shown by the fact that before fall the seed and cotyledon are withered and soon afterwards decay, while at the same time the hypocotyl becomes enlarged, forming a tuberous body about the same in size as the original seed (Figs. 4 to 7). All, therefore, that the plant does during its first growing season is develop a root system, form a good-sized bud (the epicotyl), and transfer the remaining food from the seed into the hypocotyl where it will be ready for immediate use at the beginning of the second season. It will be seen that in this way the hypocotyl as well as the epicotyl takes part in forming the embryonic rhizome of the plant.

By the second spring the decay of the seed and cotyledon is complete, and the primary root now also withers away leaving thus two scars on the tuberous hypocotyl where these parts were once attached (Figs. 8 and 9). A single long-petioled green leaf is now sent up from the tip of the epicotyl; it will be noted that this is the first part which is visible above ground, the plant being in its second year of growth (Figs. 8, 9). During this second summer the old secondary roots also increase in size and new ones are sent out from various points on the epicotyl (fig. 9).

As fall approaches the epicotyl about the base of the leaf enlarges forming a second tuber similar in appearance to the old hypocotyl and separated from it by a narrow constriction (Fig. 9). In fall a rather large bud is produced in or near the axil of the leaf, and the leaf itself withers away, leaving an elongated scar on this second tuber. During the third summer a second single leaf and a third tuber are formed almost exactly like those of the previous year, and there is a further development of the root system. The leaf decays in fall leaving a long transverse scar on the third tuber.

The fourth year a true aërial stem with two or sometimes three leaves is sent up by most and probably by all of the seedlings not accidently retarded in growth. In no case was such a stem found earlier than the fourth year. In perfect plants then the fourth tuber is always found bearing a round stem scar produced by the dropping off of this first stem and readily distinguishable from the previous leaf scars. About this time, however, the first tuber or old hypocotyl usually decays, so that four-year-old rhizomes are not always found with four tubers. On this account it becomes increasingly difficult to determine the exact age of a plant by inspection only.

Moreover after the fourth year the constrictions between the tubers become less marked until in later life an almost continuous rhizome results with only joints and stem scars to mark the annual growth, the only decrease in diameter being in the parts formed at the time of seasonal droughts and fruit production in late summer and fall. There is a very gradual increase in the size of the successive aërial stems, and it is perhaps not until about the tenth year or even later that any flowers or fruit appear. Thus the development of the seedling is a very slow process, and, since the growth of the mature rhizome is by no means fast, it will be seen that some of the ordinary large branching colonies must be very old to have reached such a size.

THE ANATOMY OF THE SEEDLING.

GENERAL NOTES ON THE VASCULAR SYSTEM (FIG. 10Y DIAGRAMIC).

The primary root (c) has a single radical wood bundle, and this divides on entering the hypocotyl (b), one branch going upward into the petiole of the cotledon (a) and the other to the epicotyl (f) at the opposite side. That which enters the petiole of the cotyledon again divides and the branches continue almost

to the end of the cotyledon where they gradually disappear. This bundle of the hypocotyl is seen about to divide in figure 12, f. The epicotyl (f) has at first no definite vascular bundles, but later a number of closed collateral bundles are formed most of which are in connection with the secondary roots that are sent out directly from the epicotyl. There is, however, some further development of conducting tissue leading from the hypocotyl into the epicotyl as lateral branches of the original bundle (Fig. 12,f). In the cross section of the hypocotyl (Fig. 12) the main bundle (c) with its branches (d) are seen in the form of a semicircle but as they approach the epicotyl they seem to take the form of an almost complete circle.

THE PRIMARY ROOT (FIG. 11).

The wood bundle of the primary root is of the radial type with alternating phloem (leptome) (f) and xylem (hadrome) (g) rays and is most often triarch but sometimes diarch or tetrarch as in the illustration. The xylem growth is exarch, and the ducts are of the ring and spiral types. The bundle is surrounded by a pericycle (e) of small flattened cells and an endodermis (d) which although not composed of thick walled cells is nevertheless very distinctive. The cortex (c) consists of about seven to ten irregular layers of short cylindrical parenchymatous cells which contain some raphides (h). The outer cortical layer is composed of larger cells (b), and these have a marked palisaded appearance. The epiblema cells (a) are small and rather thin walled even on the outer side.

THE HYPOCOTYL (FIG. 12).

The bundle (f) leading to the cotyledon shows in cross section as an irregular double row of xylem ducts with the phloem grouped about the ends of the row and on the side next the epidermis. The bundle (c) leading into the epicotyl is of the collateral type with what seems to be a nearly semicircular cambium strand (d) extending out a considerable distance on each side. This strand takes on the form of an almost perfect circle as it nears the epicotyl. In this semi-zone secondary bundles are later formed leading from the hypocotyl into the epicotyl. The space between these bundles is occupied by large cylindrical parenchyma cells (e), and the surrounding cortex (b) is of similar structure. The whole

is enclosed by an epidermis (dermatogen) (a) with a slightly thickened outer wall.

THE COTYLEDON AND ITS PETIOLE (FIG. 10).

These have two wedge-shaped closed collateral bundles with xylem (d) directed inward and phloem (c) outward. These bundles are produced by the splitting of the single flattened bundle of the hypocotyl as shown in the diagram (Fig. 12). They are very well developed since all the water entering the seed and the entire food supply which is derived from it must pass through them. The remaining portions of the cotyledon are made up of simple parenchymatous tissue (b) with a thin walled epidermis (a).

THE EPICOTYL.

The epicotyl of a germinating seedling is made up of embryonic parts which have no marked vascular structure. Later its makeup is much the same as that of the mature rhizome into which it develops.

HISTOLOGY OF THE MATURE PLANT.

THE ROOT (FIG. 21).

The epiblema (a) of the root is composed of rather thin-walled cells somewhat elongated lengthwise of the root. Beneath these is a peculiar layer of enlarged cortical cells (b) having a palisaded appearance as in the primary root. The remainder of the cortex is made up of smaller cells (c), and in young roots is from eight to ten cell layers in thickness. Next in order are a well marked endodermis of thin walled cells (d), and a pericycle surrounding the central stele. The stele itself is of the radial type with from three to seven exarch xylem (hadrome) rays (g) and alternating phoelm (leptome) strands (f). Fig. 22 is a cross section of a heptarch or seven rayed bundle from a young root tip, showing the innermost layer of ordinary cortical cells (a), the endodermis (b), and the pericycle (c) before the cells have taken on their ordinary flattened appearance. Only the protoxylem (d) and protophloem (e) have been formed, the rest of the conducting tissue being as yet undeveloped. The large cells (f) embedded in the pith (g) form metaxylem a little later.

THE RHIZOME (FIGS. 18 and 19).

In the rhizome will be seen first the epidermis (Fig. 18,a, Fig. 19, a) of flattened brick-like cells with a thickened outer wall. Beneath these is the cortex (Fig. 18, b, Fig. 19, b) of roughly

elliposoidal cells which gradually increase in size towards the center of the rhizome and merge without any line of demarcation into the large parenchymatous cells which make up the bulk of the organ. Many of these contain a few starch granules (Fig. 19, d), and there are a number of enlarged cells with raphides (Fig. 18, c, Fig. 19, c). The numerous scattered wood bundles vary in type from the closed collateral (Fig. 19, n) to those which are rather completely and typically amphivasal (Fig. 20). This transition shows the close relation that exists between these two types. The amphivasal bundles are mostly found in the center of the rhizome and in the older portion of its length, showing that they are a subsequent modification of the closed collateral. The xylem (Fig. 18, f, g, Fig. 19, e) is of the spiral and pitted types. The phloem (Fig. 18, h, Fig. 19, f) consists of the ordinary elongated sieve cells. Around each bundle there are one or two irregular layers of elongated cells which appear as a sheath (Fig. 18, d, e; Fig. 19, g), but these are not always distinctive. Fig. 20 shows an amphivasal bundle from the center of an old rhizome. The xylem (c) completely surrounds the phloem (f) and there are two sheath layers (a, b) separating the bundle from the surrounding parenchmatous tissue (e).

THE STEM (FIGS. 16. and 17).

The stem has an epidermis of brick-like cells with greatly thickened walls (Fig. 16,a; Fig. 17, a), Beneath this are found three or four layers of large thin-walled cortical cells (Fig. 16, b; Fig. 17, b). Next in order is a very distinctive zone of hardened schlerenchyma made up of cells whose walls are so much thickened that only a small lumen remains (Fig. 16, c; Fig 17, c). This schlerenchyma appears to develop from the cambium layer which earlier in the season formed the wood bundles. One small bundle (Fig. 17) is shown entirely embedded in the layer and most of those nearest it are at least partially surrounded. The remaining part of the stem enclosed in this schlerenchyma cylinder is composed of rather loosely arranged pith tissue (Fig. 17, d) which contains the numerous scattered vascular bundles. These are of the closed collateral type with the xylem (Fig. 16, e; Fig. 17, e) directed towards the center of the stem. The xylem consists mostly of spiral ducts, and the principle element of the phloem is the elongated sieve tube cells (Fig. 16, d; Fig. 17, f).

THE LEAF (FIG. 13, 14, 15).

The upper expidermis of the leaf (Fig. 13, a; Fig. 14) is composed of elongated and flattened cells with thickened walls. The lower epidermis (Fig. 13, l; Fig. 15) is simililar but is perforated by numerous stomata (Fig. 13, f). There are two palisaded cell layers immediately under the upper epidermis and these contain most of the chlorophyll (Fig. 13, b and c). Between the palisade cells and the lower epidermis the space is taken up by loose parencyhmatous tissue about four cells in thickness (Fig. 13, g). These cells have some chlorophyll and communicate with the stomata through the large intercellular spaces.

RESUME.

The following facts are considered to be peculiarly characteristic of the plant:—

1. No part of the seedling appears above ground the first year, but the plant simply transfers the food from the endosperm into its own storage parts and subsists upon it until the first leaf is completely developed during the second summer.

2. A single green leaf is sent up in the second year and another in the third year, but no aërial stem is produced before the fourth year.

3. When the fourth tuber of the rhizome has appeared, the first has usually rotted, making it difficult to estimate the age of a young plant by simple inspection.

4. A well marked vascular development of the cotyledon is a notable feature of the seedling anatomy.

5. In primary roots there is a variation of the plerome from diarch to tetarch and in secondary roots from triarch to heptarch.

6. Most of the wood bundles in the constricted portion of the annual growth are amphivasal while all of those in the thicker portion are collateral. What seems to be a probable explanation of this fact might be given here. The aërial stem is produced each year from a bud at the extremity of the rhizome, but the rhizome later continues growth beyond this point leaving the aërial stem in the position of a branch. The first part of this annual growth of the rhizome is a much thickened food storage organ, and since at this time it is not the in main line of water condition there is little use for xylem and the bundles there remain collateral. The continuations of these bundles in the later and more constricted

part of the annual growth are also at first collateral, but winter overtakes these in an undeveloped condition. The following spring most of these bundles divide at their growing point, part of the new elements going upward into a new aërial stem and part into a further extension of the rhizome. On account of the great demand for soil sap in the new stem the unfinished collateral bundles in the adjacent constricted part of last year's rhizome growth develop an unusual amount of xylem in connection with new secondary roots and become amphivasal. In the more distant expanded part of the rhizome the continuations of these bundles being already mature remain collateral as at first, but many of them develop excessive numbers of xylem elements which do not, however, encircle the phloem (Fig. 17.)

EXPLANATION OF THE FIGURES.

Figs. 1–9. Illustration of the stages of development of the seedling from the time of germination until the end of the second year's growth. All of the illustration are exactly life size. Fig. 1. Germinating seed with primary root and hypocotyl emerging. Fig. 2. Later stage with elongated primary root, swollen hypocotyl, and the slit through which the epicotyl is to emerge. Fig. 3. The epicotyl appearing through the slit. Fig. 4. Stage in the further development of the epicotyl and primary root. Figs. 5 and 6. Formation of secondary roots. Fig. 7. Elongation of epicotyl and production of leaf scales. Fig. 8. Seedling with leaf in second season of growth. The cotyledon has disappeared and the primary root is withering. Fig. 9. A later stage in the second year's growth showing the formation of the second tuber.

Fig. 10. Cross section of the petiole of the seedling cotyledon. (a) epidermis, (b) cortical tissue, (c) phloem, (d) xylem.

Fig. 10x. Food storage cells of the seed endosperm.

Fig. 10y. Longitudinal diagrammatic section of the tissue systems in a young seedling. The side figures show diagrammatic cross sections at the places indicated by the dotted lines. (a) petiole of cotyledon, (b) hypocotyl, (c) primary root, (d) seed, (e) cotyledon, (b) epicotyl.

Fig. 11. Cross section of the primary root of the seedling. (a) epiblema, (b) palisaded layer of the periblem, (c) ordinary periblem cells, (d) endodermis, (e) pericycle, (f) phloem and (g) xylem, constituting the plerome, (h) raphides.

Fig. 12. Cross section of the hypocotyl. (a) dermatogen, (b) periblem, (c) bundle leading to epicotyl, (d) cambium layer, (e) central parenchymatous tissue, (f) bundle leading to cotyledon.

Fig. 13. Cross section of the leaf of amature plant. (a) upper epidermis, (b and c) palisaded layer, (d) wood bunble, (e) lower epidermis, (f) stoma, (g) loose chlorenchyma.

Fig. 14. Surface view of upper epidermis showing cell structure.

Fig. 15. Surface view of lower epidermis containing stomata.

Fig. 16. Longitudinal section of mature stem taken late in season when growth in thickness had ceased and all of the tissues were in permanent condition. (a) epidermis, (b) cortex, (c) schlerenchyma, (d) pith, (e) xylem, (f) phyloem.

Fig. 17. Cross section of the same. (a) epidermis, (b) cortex, (c) schlerenchyma, (d) pith, (e) xylem, (f) phloem.

Fig. 18. Longitudianl section of mature rhizome. (a) epidermis, (b) cortex, (c) cell containing raphides, (d and e) sheaths of elongated cortical cells, (f and g) xylem, (h) phloem. The bundle is amphivasal, and a duct is shown at the extreme right.

Fig. 19. Cross section through the mature rhizome. (a) epidermis, (b) cortex, (c) cell with raphides, (d) starch granules, (e) xylem, (f) phloem in an almost amphivasal bundle, (g) sheath of cortical cells, (h) a small typical collateral bundle.

Fig. 20. Cross section in detail through a more typical amphivasal bundle from center of an old rhizome. (a and b) sheath layers, (c) xylem, (d) cells which will later from xylem, (e) cortex, (f) phloem.

Fig. 21. Cross section of a small secondary root. (a) epelbema, (b) outer palisaded layer of periblem, (c) ordinary periblem cells, (d) endodermis, (e) pericycle, (f) phloem, (g) xylem.

Fig. 22. Cross section of the wood bundle from the tip of a larger secondadry root on an older part of the plant. (a) periblem, (b) endodermis, (c) periclycle, (d) xylem, (e) phloem, (f) cells which form meta-xylem, (g) pith cells.

The scale of magnification accompanies each figure.

ABNORMAL FLOWERING OF HEPATICA.

BY J. A. NIEUWLAND.

The tendency to redundancy of sepals in Hepatica, our common liver-leaf, a plant that adds so much to the beauty of our early spring woods, was noticed several hundred years ago by Lobelius[1] or as he is also known de l'Obel. He even gave the double flowered plant the varietal name, customary in those days, calling it *Hepatica trifolia polyanthos*, or doubled flowered *Hepatica trifolia*. Parkinson[2] in 1629 also describes such plants under practically the same name. The Liverleaf itself was even earlier called Hepatica by Bock[3] in Brunfels great work of botany, the first that included good natural lifelike illustrations of plants in the sixteenth century.

Since in this plant it may be considered that the so-called "sepals" arise by the change of the stamens into these in doubling,

and that the latter proportionately diminish in number and often disappear entirely not only when cultivated but also wild, it is probably worth while considering them at least in part as real petals. The flowers of the plant are then to be considered as really rather asepalous than apetalous. Such doubled flowers have been found as intimated even in their native haunts in perfectly wild conditions.

Color variations are even more common. A hillside of plants of *H. acuta* was seen during the last season where the flowers ranged from perfectly pure white through lavender, pink, rose, purple, all with or without darker margins to light blue dark blue and even the darkest violet, all the plants being indiscriminately scattered over the hillside facing the sun. I could only account for this wonderful show of color variation from the fact that the previous fall the area had been burnt over. A similar condition seemed to cause all or nearly all of the plants of *Viola populifolia*, our common blue violet, to have blotched and streaked petals on their flowers. These violets were found in this condition only where the leaves were burnt away the year before. Some of these were transferred to a garden and bloomed the second season with similarly blotched flowers, blue and white streaked.

A plant of *Hepatica* was found in which all the bracts were very close to the flower parts, in fact almost on the torus of the flower. These bracts were distinctly three-lobed and seemed to approximate the shape of the true hepatica leaves in being very broad, whereas the ordinary bracts are usually oval and quite entire or ovate. In the flowers of this plant the outer "sepals" colored in the typical plant were here green and herbaceous on the margins. This would seem to indicate a tendency on the part of the "sepals" to become bractlike or become real green sepals. As there are in most plants of *Hepatica* two more or less complete whorls of the so-called "sepals" it were perhaps not incongruous to consider that these plants have both real sepals and real petals in more or less complete whorls usually alike, butin such cases atavistically tending to differentiate themselves, the outer gradually changing themselves under normal conditions into bracts gradually, and the inner similarly showing by the change of stamens into them that there is no break in the number of floral envelopes.

Another anomalous condition of inflorescence in this plant

was seen at the same time in a number of individuals. One of these had beside the normal one-flowered about six others with two or three subsessile flowers in the bracts. In one instance the third flower was neutral having "sepals" alone. This condition was not one of fasciation as the usual flattened peduncles of greater diameter in one way were absent and the stalks appeared no different than in normal. In several cases the usual three bracts were present and the supernumerary flowers came from these in umbel fashion. In one case two flowers were found at the end of a common pedicel (bracts some distance below) and on a common receptacle or double torus. In several the outer bracts of the cluster were 2 to 3-lobed or notched. The several flowers had very distinct pedicels nearly all with their own secondary bracts and only one bractless. In another a bent one-bracted node or joint was found at the base of the several pedicels of the umbel-like cluster. Still, another more peculiar specimen consisted of a peduncle with a larger bract near the top. From the axis of this arose two pedicels, one with a normal flower, the other with two flowers on a common torus. The larger of these two had three three-nothced bracts and the other two three-notched bracts at the apex.

A CORRECTION NEEDING CORRECTION.

Some years ago the term macrospore for the larger non-sexual speciallized reproductive cell of the heterosporous pteridophyta was found objectionable because the name was deemed inaccurate in meaning. The word μακρός (macros) in Greek means "long" and the spores in question are not long but large, or big. It might have been thought by some more or less conservative botanists of the "laissez faire" type that the attempt at correction might be considered as fastidiousness. Scientists, however ought to be exact especially in their terminology, though an equally industrious attempt to correct nomenclature usually raises a clamor among the morphologists who carp at continual name changing. Be this as it may, the object in question suggests rather the idea of largeness, and hence ought to have come from the Greek word μέγας (megas). The name was accordingly changed to "megaspore" and in a few months it was even enthusiastically received by all without exception, and, as far as we

can find, still holds sway. We wondered at the time the name was proposed, how long it would take to find that though correctly derived as to its meaning it is grammatically wrong in form. In fact we have after these number of years without shadow of suspicion on the part of many, had to endure an etymological monstrosity, which has not only been taken up into the terminology of the science but accepted by otherwise reputed scientists, and that without any question as to the credentials of the correction deserving commendation.

A mere beginner in Greek literature would have known from his first few lessons in that language that any name coming from the word *μέγας*, fem., *μεγάλη*, neut. *μέγα*, having the genitive *μεγάλου*, must according to the rules for the derivation of words in the ancient languages come from the root of the word. The root of the word in question is *μεγαλ*, from the genitive *μεγάλου*. The name then should have been **megalospore**, the "O" being inserted before consonants. The taking of the simple nominative case of a word may be an easy way for the name tinkers, but it is as unpardonable to burden a nomenclature or a terminology with these mongrel names, as is the using of a plural form of verb with a singular subject. The former moreover is not nearly as uncommon as one would at first suspect. It may be said on the one hand that this matter is not strictly botanical in relevance and of minor moment, but the dignity of a science merits better from its makers of names. On the other hand it may be asked "Why was not attention called sooner to the matter? instead of criticizing when perhaps too late?" It is to us still a matter of wonder that the name was not sooner amended, and perhaps, such is the indifference on the part of our writers or maybe rather ignorance, that the results might have been the same in the long run anyway.

As an example of the proper use of names with *μέγας* we have the following plant names, and more may be found in the Index Kewensis: *Magalodonta*, Greene, *Megalotropus*, *Megalachne*. On the other hand *Megastachya*, *Megastigma* show that our nomenclature as well as our terminology may be improved. Moreover as the name of the group of so-called brown algae we say *Melanophyceae* (instead of the incorrect Melaphyceae) though the derivation is from the Greek word *μέλας*, *μέλαινα*, *μέλαν*, meaning black.

DISTRIBUTION OF OUR BIRDS IN SPRING.

BY BROTHER ALPHONSUS, C. S. C.

In four springs, the Blue Jay was least abundant in March, there having been a total of 72 records for that month. In the same period, there were 111 records for April and 113 for May. A comparison of the totals for each spring shows considerable disparity. Between the highest total and each of the others there were respectively 6, 18 and 30 records. The total number of records for the four seasons was 306, the species not having been observed on 62 days.

Unlike the Blue Jay, the Crow's records in four years, show a decrease from March to May, the totals for the three months being 101, 93 and 76 records. The various totals for each year show successively differences of 18, 29, 23 records fewer than the highest total in 1910. There is a very slight difference between the records of 1911, 1912, 1913, 11 records being the highest and 5, the lowest. The total for the four seasons was 270 records,

The Snowbird, for four years, was most abundant in April, the total number of records for that time having been 104. For the same period, March shows 71 and May 5 records. In March, the species was most unevenly distributed, as the number of records for four years shows—27, 14, 9, 21. In the totals for each of four seasons, the greatest difference was 16 and the smallest, 5 records. The total for four springs was 180 records.

The Bluebird presents records that are exceptional in one year—1912. The total for the spring of that year was 17 records, which was 28 fewer than the lowest total of any of the other three years. For four springs, the species was most abundant in April and least plentiful in May. Leaving out the records for 1912, and there is but a slight difference in the totals for March and April, 63 records for the former and 70 for the latter. Making a comparison, without the records for 1912, we find the various totals for the other years showing 29 records as the greatest difference and 19 as the least. The total for four years was 191 records.

The Robin shows exceptional irregularity in March, 1912—, there being only 9 records for that month. Barring this exception, the species is a typical example of great regularity in all the spring months. In March, 4 records was the greatest difference, and 2

records, the smallest; in April, the only difference was 2 records; in May, there was but one record fewer, in 1911. The Robin's total number of records for four seasons was 321—the species not having been seen on 47 days.

The Bronzed Grackle was least abundant in March, having 73 records in four years. The cold winter of 1912 shows only 8 records for March. The species was very regular in April and May, with a difference of only 4 records; and deducting the extra day in May, there would have been only 2 records fewer in April. The total for four springs was 313 records.

The Song Sparrow, in March, had the same number of records as the Bronzed Grackle—73. There was great regularity in April and May, the species not having been found only on one day in May in four years; and having been observed every day in April for the same time. In its total for four springs, the Song Sparrow exceeded the Bronzed Grackle by one record, having had 314 records.

Like the other spring migrants, the Meadowlark was least regular in March—having for four years a total of 60 records. In April and May, the special was abundant, and showed but 5 records as the difference between the totals for those months in four seasons. The total for four years was 292 records.

The White-breasted Nuthatch presents a case of singular irregularity in all the spring months. I shall give the complete records for the four years that the reader may see at a glance in what way the species was distributed.—Records for March: 3, 20, 0, 11;—total, 34. April: 7, 17, 7, 17;—total, 41. May: 8, 13, 4, 9;—total, 34. Totals for each spring: 1910, 28; 1911, 50; 1912, 11; 1913, 37. Total for four seasons, 126 records. My records for the species in the spring of 1914 were still more irregular.

In March, the Cowbird had but 13 records in four years. In April and May, the species was abundant, as the records for those months show—April having as a total 105, and May, 115 records. In the four seasons, the species totalled 229 records, falling considerably below the records of the Bronzed Grackle, but exceeding by nearly 50 records those of the Red-winged Blackbird.

The Red-winged Blackbird, in four years, totalled 18 records for March, 72 for April, and 90 for May; making the total for the four seasons 180 records. Unless an observer frequents a marshy part of the country, he will not obtain satisfactory records for

this species. For this reason, my own records, I know, are somewhat incomplete.

The Flicker was seen on 7 days in March, 1910; but was not recorded in that month in any other year. The total for April, in four years, was 87 records, with 33 failures; for May, 80 records, with 44 failures. The average total number of records for each spring was 43, and the total for the four seasons was 174 records.

In March, 1910, the Vesper Sparrow was seen on 9 days; in the other three years, these were no records for March. April totalled 81 records, and May, 91, for four years. Between the highest and lowest totals, in four seasons, there was a difference of 14 records. The average number of records for each spring was about 44, and the total for four years was 177 records.

The March records for the Mouring Dove totalled, in four years, 7; there having been none in 1912. The April records were 77; the May, 113; and the difference, 36 records. The difference between the highest and lowest totals, in four years, was only 9 records. For the four seasons, the average was nearly 52 records, and the total was 207 records.

The Phoebe, in four years, had 10 March records. In 1912, there were no records for March, two for April, and one for May. Although the totals for April and May, in the other years, were respectively 39 and 31 records, yet these figures do not give a correct idea of the distribution of the species. Barring 1912, April shows the greatest difference in its records to be 13, and May, 9. The four springs totalled 80 records. It would be interesting to determine the relative abundance of the Phoebe and the Wood Pewee. The latter being essentially a species of the woods, it is easy to record it daily, after its arrival in May. The Phoebe arrives, sometimes in March; but nests only in favorable places; and thus is not so easily recorded.

The records of the Kingfisher show that the species was most abundant in April, the total for four years being 41 records. In 1910, the April records reached 19, which was almost double as many as those of any other year. In May, there was uniformity in the number of records for each year, the highest being 9, and the total, 25. The species was exceedingly rare in March—only 4 records having been made in four years. For the four seasons, a total of 70 records is shown.

In April, the Towhee shows considerable disparity in its records; the highest being 15 and the lowest 4, with a total of 38 records—the largest number in any of the spring months. In May, 1911, there was no record made for the species; in 1912, only 4 records; in the other two years the records were uniform—15 and 18, respectively. In March, there were 2 records in 1910, and none in the other years. The total for four seasons was 77 records.

The Field Sparrow ranks among the most regular species. In March, the difference between the highest and lowest number of records was 5; in April, the difference was 6; in May, 5. In March, the total for four years was 5 records; in April, 100 records; in May, 105 records. The total for all the spring months was 220 records.

In March, the Chipping Sparrow was recorded 4 times in two years, but no record was made in 1912 and 1913. In April, the species was irregular, the lowest record having been 13, in 1912; and the total, 80 records, in four years. In May, the records totalled 120, with only 4 days on which the species was not seen. The average total for each spring was 51 records. In the four seasons, there was a total of 204 records, and 164 days when the species was not found.

In only one year, 1910, was the Sapsucker seen in each of the spring months. The total for that year was 23 records, which was either equal to, or greater, than the total of any other two years. The total for the other three years was 31 records; and for the four springs, 54 records. In 1912 and 1913, the species was recorded only in April, both years together totalling 23 records. In three years, the Sapsucker was not found in March; and in two years, it was not seen in May.

The Golden-crowned Kinglet had 6 records in March, 29 in April, and none in May. The total for four springs was 35 records. The Ruby-crowned Kinglet had no records in March, 19 in April, and 10 in May. The total for four seasons was 29 records. From these records, the reader may readily see which species is the hardier and the more abundant.

Although the Goldfinch is a species that may be found in any month of the year, still my observations for the spring months in four years show that the Goldfinch had 2 records in March; 21, in April; 104, in May. The total was 127 records. It is difficult

to determine why the species was so seldom seen in March and April, unless the food supply is scanty in those months.

In four springs, the Red-headed Woodpecker was recorded but twice in March; and was recorded on 36 days in April, and on 116 days in May; making a total of 152 records. Now the writer has a very interesting fact to state about this species, which he considers the most remarkable case of disparity in distribution that has ever come under his observation. In the spring of 1914, the Red-headed Woodpecker was recorded on 26 days in March, and on 28 days in April; making a total of 54 records. The species did not migrate in the autumn of 1913, and remained all during the following winter, which was very mild.

The Downy Woodpecker, in 1910 and 1912, had but 20 records; in 1911 and 1913, the species had 64 records. Such great disparity of distribution, in four years, seems remarkable; and yet it is typical of the species, which is always comparatively rare in May, and sometimes in March and April. Like the White-breasted Nuthatch, the Downy Woodpecker is seldom seen during the nesting season. The total number of records for the species in four springs was 84.

The Tree Sparrow was recorded 28 times in March and 18 times in April, totalling 46 records. In three years—1910 to 1912—the species had 15 records for March; and 13 for that month in 1913; thus showing irregularity for March. In April, a similar irregularity is evident from the following records: 1910, 0; 1911, 4; 1912, 10; 1913, 4. I have found this species abundant in winter during mild weather; and when spring arrives early in March, the Tree Sparrow should be regularly seen during that month.

The Brown Creeper was present on 8 days in March and on 21 days in April. The highest record for the species was in 1913—March showing 5 and April 10 records. Why the other three years had only 14 records for their total, seems inexplicable. But this species, I have found, is irregular thoroughout the year.

In May, 1910 and 1911, the Red-eyed Vireo had 4 records for each year. In 1912, the species had 13 records; in 1913, 12 records; the total for four years being 33 records. The Red-eyed Vireo is not often heard outside of deep woods; but why there should be such great disparity between the records of two sets of years, I can not explain.

The Rose-breasted Grosbeak was here on 4 days in May,

1910 and 1912; on 7 days in 1913; in 1911, the species did not appear. From these records, it will be seen that this Grosbeak is very locally distributed. So far, I have never recorded the species outside of spring.

The Loggerhead Shrike was recorded 4 times in March and 6 times in April, 1910; once in March and twice in April, 1912; twice in April and once in May, 1913; making a total of 16 records. This shrike nests usually in hedges, in outlying districts, which accounts for the few records that I obtained for the species.

The Killdeer, by its spring records, shows that it is a rare species during that season. In four years, March had 18 records; April had 28; and May had 27; making a total of 73 records. There is also a considerable difference between two set of years; 1910 and 1913 having together 51 records; and 1911 and 1912 showing only 22 records. The species is somewhat solitary during the nesting season, not often visiting places distant from the rest.

Among the species that were recorded only in April and May were: White-throated Sparrow, Hermit Thrush, Brown Thrasher, Barn Swallow, House Wren, Spotted Sandpiper, Baltimore Oriole, Warbling Vireo, Kingbird. The White-throated Sparrow, in four years, had 16 records in April and 40 in May; the total being 56 records. The Hermit Thrush was recorded on 29 days in April and on 75 days in May, with a total of 104 records. The Brown Thrasher shows 53 records for April and 109 for May, with a total of 162 records. The Barn Swallow was seen on 11 days in April and on 44 days in May, totalling 55 records. The House Wren had 9 records in April and 104 in May, with a total of 113 records. The Spotted Sandpiper was recorded on 15 days in April and 104 in May, with a total of 113 records. The Spotted Sandpiper was recorded on 15 days in April and on 89 days in May, totalling 104 records. The Baltimore Oriole was found on 2 days in April and on 117 days in May. The Warbling Vireo had 5 records in April and 130 in May. The Kingbird was seen once in April and 94 times in May.

Among the warblers recorded in April and May or in May alone were: Myrtle Warbler, Yellow Warbler, Yellow Palm Warbler, Redstart, Bay-breasted Warbler, Black-throated Green Warbler, Black and White Warbler, Maryland Yellowthroat, Black-throated Blue Warbler, Blackburnian Warbler, Black-poll

Warbler, Tennessee Warbler, Chestnut-sided Warbler, Magnolia Warbler, Sycamore Warbler, Canadian Warbler, Kentucky Warbler Nashville Warbler, Prairie Warbler, Yellow-breasted Chat—in all 20 species.

The Myrtle Warbler was recorded 21 times in April and 41 times in May, totalling 62 records—which was the highest number reached by any of the warblers. The Yellow Warbler had 5 records in April and 53 in May. The Yellow Palm Warbler was found on 9 days in April and on 37 days in May. The Redstart was recorded twice in April and 10 times in May. The Bay-breasted Warbler was seen on 5 days in May. The Black-throated Green Warbler had 13 records for May. The Black and White Warbler was found once in April and 3 times in May. The Maryland Yellowthroat had one record in April and 18 in May; this species was not found in the spring of 1912. Thd Black-throated Blue Warbler was recorded once—in May, 1912. The Blackburnian Warbler was observed once in May, 1912, and once in May, 1913. The Blackpoll Warbler was seen on 8 days in May, 1912, and on 11 days in May, 1913. The Tennessee Warbler had 9 records in May, 1912, and one in May, 1913. The Chestnut-sided Warbler was present on 4 days in May, 1912, and on 14 days in May, 1913. The Magnolia Warbler's records were: 9 in May, 1912; 4 in May, 1913. The Sycamore Warbler had 6 records in May, 1912. The Canadian Warbler was seen once in May, 1912, and twice in May, 1913. The Kentucky Warbler was found twice in May, 1912. The Nashville Warbler was recorded on 3 days in May, 1913. The Prairie Warbler and the Yellow-breasted Chat were each recorded once in May, 1913.

Some rare or very rare species were: Canada Geese, Hairy Woodpecker, Herring Gull, Chickadee, Bobolink, Least Flycatcher, Hummingbird, Louisiana Water Thrush, Screech Owl and Fox Sparrow. Canada Geese were recorded 8 times in March; Hairy Woodpecker, 3 times in March; Herring Gull, 6 times in March and once in April. The Chickadee had 6 records in March, 4 in April and 1 in May. This species is an inhabitant of deep woods, which it seldom leaves, except in autumn and early winter. The Bobolink shows 12 records for May. This species usually keeps to outlying meadows. The Least Flycatcher had 15 records in May. The Hummingbird was seen on 3 days in May. The Louisiana Water Thrush had one record in May, 1910; and 17

in May, 1913. If May is dry, this species may not be recorded. The Screech Owl was heard once in March and 4 times in May. The Fox Sparrow was found on 5 days in April.

A number of species were recorded so rarely that the reader can readily find information about them in the appended records of each species in all the months of spring.

The total number of species that were observed in the four springs, 1910-1913, was 111.

	1910			
	March	April	May	Total
Blue Jay	29	30	31	90
Crow	29	25	31	85
Snowbird	27	23	4	54
Bluebird	28	27	19	74
Robin	24	30	31	85
Bronzed Grackle	25	30	31	86
Song Sparrow	27	30	31	88
Meadowlark	24	30	31	85
White-breasted Nuthatch	3	7	18	28
Loggerhead Shrike	4	0	6	10
Canada Geese	4	0	0	4
Tree Sparrow	6	0	0	6
Cowbird	9	27	30	66
Flicker	7	23	21	51
Vesper Sparrow	5	24	21	50
Mourning Dove	3	19	28	50
Phoebe	3	6	15	24
Hairy Woodpecker	2	0	0	2
Kingfisher	1	19	6	26
Killdeer	9	6	5	20
Red-winged Blackbird	12	18	25	55
Herring Gull	2	1	0	3
Downy Woodpecker	2	6	1	9
Towhee	2	8	15	25
Prairie Horned Lark	2	0	0	2
Red-shouldered Hawk	1	0	0	1
Field Sparrow	6	28	29	63
Sapsucker	4	15	4	23
Chipping Sparrow	3	28	31	62
Golden-crowned Kinglet	1	7	0	8
Hell Diver	1	0	0	1
Brown Creeper	2	0	0	2
Goldfinch	0	10	28	38
Red-headed Woodpecker	0	10	29	39
Cardinal	0	3	4	7
Ruby-crowned Kinglet	0	8	4	12

	March	April	May	Total
White-throated Sparrow	0	5	14	19
Hermit Thrush	0	10	23	33
Tufted Titmouse	0	1	0	1
Brown Thrasher	0	13	30	43
Barn Swallow	0	1	10	11
Sparrow Hawk	0	1	2	3
House Wren	0	2	25	27
Spotted Sandpiper	0	1	19	20
Myrtle Warbler	0	0	15	15
Yellow Warbler	0	0	16	16
Baltimore Oriole	0	0	30	30
Warbling Vireo	0	0	27	27
Yellow Palm Warbler	0	0	12	12
Kingbird	0	0	23	23
Redstart	0	0	2	2
Bay-breasted Warbler	0	0	1	1
Catbird	0	0	24	24
Purple Martin	0	0	5	5
Rose-breasted Grosbeak	0	0	4	4
Chimney Swift	0	0	22	22
Black-throated Green Warbler	0	0	3	3
Scarlet Tanager	0	0	9	9
Chickadee	0	0	1	1
Crested Flycatcher	0	0	13	13
Orchard Oriole	0	0	21	21
Black and White Warbler	0	0	2	2
Maryland Yellow Throat	0	0	14	14
Alder Flycatcher	0	0	7	7
Dickcissel	0	0	10	10
Bobolink	0	0	6	6
Least Flycatcher	0	0	3	3
Red-eyed Vireo	0	0	4	4
Wood Pewee	0	0	11	11
Hummingbrid	0	0	2	2
Louisiana Water Thrush	0	0	1	1
Indigo Bird	0	0	12	12
Loon	0	0	2	2

1911

	March	April	May	Total
Blue Jay	25	29	30	84
Crow	26	25	16	67
Tree Sparrow	5	4	0	9
White-breasted Nuthatch	20	17	13	50
Screech Owl	1	0	0	1
Chickadee	6	3	0	9
Bluebird	21	19	5	45

	March	April	May	Total
Robin	26	30	30	86
Downy Woodpecker	10	10	7	27
Song Sparrow	21	30	30	81
Meadowlark	16	29	30	75
Bronzed Grackle	21	30	30	81
Killdeer	2	4	4	10
Canada Geese	3	0	0	3
Red-winged Blackbird	3	11	20	34
Herring Gull	1	0	0	1
Red-headed Woodpecker	2	23	30	55
Snowbird	14	24	0	38
Field Sparrow	3	24	24	51
Brown Creeper	1	3	0	4
Golden-crowned Kinglet	2	3	0	5
Kingfisher	1	8	4	13
Phoebe	3	12	6	21
Mourning Dove	2	20	26	48
Chipping Sparrow	1	17	30	48
Winter Wren	0	4	0	4
Cowbird	0	25	28	53
Red-headed Woodpecker	0	23	30	53
Flicker	0	18	15	33
Goldfinch	0	5	25	30
Fox Sparrow	0	1		1
Towhee	0	11	0	11
Purple Finch	0	6	6	12
Vesper Sparrow	0	12	19	31
Hermit Thrush	0	13	5	18
Sapsucker	0	7	1	8
Brown Thrasher	0	12	23	35
Loggerhead Shrike	0	2	2	4
Hell Diver	0	1	0	1
White-throated Sparrow	0	3	6	9
Ruby-crowned Kinglet	0	2	3	5
Redstart	0	1	0	1
Barn Swallow	0	2	6	8
Myrtle Warbler	0	5	6	11
Spotted Sandpiper	0	4	24	28
Maryland Yellowthroat	0	1	3	4
Yellow Warbler	0	4	7	11
House Wren	0	2	28	30
Kingbird	0	1	21	22
Yellow Palm Warbler	0	1	2	3
Warbling Vireo	0	1	26	27
Nighthawk	0	0	5	5
Catbird	0	0	26	26
Baltimore Oriole	0	0	27	27

	March	April	May	Total
Chimney Swift	0	0	25	25
Cardinal	0	0	2	2
Purple Martin	0	0	5	5
Orchard Oriole	0	0	22	22
Whip-poor-will	0	0	3	3
Bobolink	0	0	1	1
Wood Pewee	0	0	17	17
Crested Flycatcher	0	0	14	14
Dickcissel	0	0	16	16
Scarlet Tanager	0	0	2	2
Red-eyed Vireo	0	0	4	4
Indigo Bird	0	0	5	5
Yellow-billed Cuckoo	0	0	11	11
Alder Flycatcher	0	0	1	1
Cedarbird	0	0	1	1

1912

	March	April	May	Total
Crow	20	24	12	56
Blue Jay	17	28	27	72
Tree Sparrow	4	10	0	14
Robin	9	28	31	68
White-breasted Nuthatch	0	7	4	11
Downy Woodpecker	2	5	4	11
Snowbird	9	29	1	39
Hairy Woodpecker	1	0	0	1
Snowflake	2	0	0	2
Red-poll	1	0	0	1
Killdeer	1	7	4	12
Cardinal	1	3	0	4
Bronzed Grackle	8	28	31	67
Meadowlark	9	29	26	64
Goldfinch	2	3	22	27
Song Sparrow	8	30	30	68
Bluebird	2	13	2	17
Red-shouldered Hawk	1	0	1	2
Herring Gull	1	0	0	1
Loggerhead Shrike	1	2	0	3
Field Sparrow	1	22	27	50
Brown Creeper	0	8	0	8
Fox Sparrow	0	5	0	50
Towhee	0	4	4	8
Vesper Sparrow	0	26	29	55
Red-winged Blackbird	0	2	1	3
Mourning Dove	0	16	29	45
Hermit Thrush	0	2	24	26
Cowbird	0	24	30	54

	March	April	May	Total
Golden-crowned Kinglet	0	13	0	13
Screech Owl	0	2	0	2
Kingfisher	0	4	9	13
House Wren	0	0	21	21
Flicker	0	18	19	37
Sapsucker	0	9	0	9
Chipping Sparrow	0	22	31	53
Barn Swallow	0	6	8	14
Brown Thrasher	0	12	28	40
Myrtle Warbler	0	5	8	13
Bobwhite	0	1	0	1
Spotted Sandpiper	0	5	26	31
Red-headed Woodpecker	0	1	28	29
Black and White Warbler	0	1	3	4
Warbling Vireo	0	1	27	28
Ruby-crowned Kinglet	0	0	2	2
Yellow Palm Warbler	0	0	10	10
White-throated Sparrow	0	0	10	10
Chimney Swift	0	0	26	26
Yellow Warbler	0	0	12	12
Baltimore Oriole	0	0	30	30
Rose-breasted Grosbeak	0	0	4	4
Indigo Bird	0	0	11	11
Catbird	0	0	30	30
Orchard Oriole	0	0	20	20
Kingbird	0	0	27	27
Black-throated Blue Warbler	0	0	1	1
Black-throated Green Warbler	0	0	7	7
Redstart	0	0	4	4
Bobolink	0	0	3	3
Blackburnian Warbler	0	0	1	1
Scarlet Tanager	0	0	3	3
Least Flycatcher	0	0	4	4
Alder Flycatcher	0	0	2	2
Crested Flycatcher	0	0	13	13
Cedarbird	0	0	2	2
Yellow-billed Cuckoo	0	0	5	5
Nighthawk	0	0	7	7
Whip-poor-will	0	0	1	1
White-breasted Nuthatch	0	0	4	4
Bittern	0	0	2	2
Black-poll Warbler	0	0	8	8
Tennessee Warbler	0	0	9	9
Red-eyed Vireo	0	0	13	13
Red-breasted Nuthatch	0	0	2	2
Chestnut-sided Warbler	0	0	4	4
Magnolia Warbler	0	0	9	9

	March	April	May	Total
Wood Pewee	0	0	17	17
Sycamore Warbler	0	0	6	6
Wood Thrush	0	0	2	2
White-crowned Sparrow	0	0	1	1
Bay-breasted Warbler	0	0	5	5
Canadian Warbler	0	0	1	1

1913

	March	April	May	Total
Blue Jay	11	24	25	60
Crow	26	19	17	62
Snowbird	21	28	0	49
Downy Woodpecker	11	17	7	35
White-breasted Nuthatch	11	17	9	37
Tree Sparrow	13	4	0	17
Bluebird	14	24	17	55
Brown Creeper	5	10	0	15
Song Sparrow	17	30	30	77
Meadowlark	11	30	27	68
Robin	22	30	30	82
Killdeer	6	11	14	31
Red-winged Blackbird	3	27	28	58
Phoebe	4	19	9	32
Mourning Dove	2	22	30	54
Cowbird	4	29	27	56
Kingfisher	2	10	6	18
Northern Shrike	1	0	0	1
Bronzed Grackle	19	30	30	79
Field Sparrow	5	26	25	56
Herring Gull	2	0	0	2
Canada Geese	1	0	0	1
Golden-crowned Kinglet	3	6	0	9
Flicker	0	28	25	53
Chipping Sparrow	0	13	28	41
Loggerhead Shrike	0	2	1	3
Red-shouldered Hawk	0	1	1	2
Sparrow Hawk	0	1	0	1
Chickadee	0	1	0	1
Vesper Sparrow	0	19	22	41
Fox Sparrow	0	4	0	4
Towhee	0	15	18	33
Hermit Thrush	0	4	23	27
Sapsucker	0	14	0	14
Barn Swallow	0	2	20	22
Myrtle Warbler	0	11	12	23
Spotted Sandpiper	0	5	20	25
Red-headed Woodpecker	0	2	29	31

	March	April	May	Tota
Warbling Vireo	0	3	30	33
Brown Thrasher	0	16	28	44
Ruby-crowned Kinglet	0	9	1	10
Resdtart	0	1	4	5
White-throated Sparrow	0	8	8	16
Tennessee Warbler	0	1	0	1
House Wren	0	5	30	35
Goldfinch	0	3	29	33
Red-breasted Nuthatch	0	2	1	3
Baltimore Oriole	0	2	30	32
Yellow Warbler	0	1	18	19
Yellow Palm Warbler	0	8	13	21
Long-billed Marsh Wren	0	1	0	1
Kentucky Warbler	0	0	2	2
Chimney Swift	0	0	29	29
Indigo Bird	0	0	10	10
Catbird	0	0	28	28
Orchard Oriole	0	0	22	22
Kingbird	0	0	23	23
Black-throated Green Warbler	0	0	3	3
Scarlet Tanager	0	0	3	3
Least Flycatcher	0	0	8	8
Alder Flycatcher	0	0	4	4
Crested Flycatcher	0	0	15	15
Cedarbird	0	0	6	6
Yellow-billed Cuckoo	0	0	4	4
Black-billed Cuckoo	0	0	1	1
Nighthawk	0	0	8	8
Whip-poor-will	0	0	1	1
Black-poll Warbler	0	0	11	11
Red-eyed Vireo	0	0	12	12
Magnolia Warbler	0	0	4	4
Wood Pewee	0	0	17	17
Bay-breasted Warbler	0	0	2	2
Ruby-crowned Kinglet	0	0	1	1
Blackburnian Warbler	0	0	1	1
Nashville Warbler	0	0	3	3
Red-breasted Nuthatch	0	0	1	1
Acadian Flycatcher	0	0	3	3
Chestnut-sided Warbler	0	0	13	13
Bobolink	0	0	2	2
Rose-breasted Gorsbeak	0	0	7	7
White-crowned Sparrow	0	0	6	6
Canadian Warbler	0	0	2	2
Black and White Warbler	0	0	5	5
Screech Owl	0	0	4	4
Cardinal	0	0	1	1

	March	April	May	Total
Swamp Sparrow	0	0	3	3
Louisiana Water Thrush	0	0	17	17
Blue Gray Gnatcatcher	0	0	1	1
Prairie Warbler	0	0	1	1
Yellow Rail	0	0	3	3
Tree Swallow	0	0	1	1
Blue-headed Vireo	0	0	5	5
Yellow-breasted Chat	0	0	1	1
Yellow-bellied Flycatcher	0	0	1	1
Hummingbird	0	0	1	1
Carolina Wren	0	0	1	1
Maryland Yellowthroat	0	0	1	1

DISTRIBUTION OF OUR BIRDS IN WINTER.

BY BROTHER ALPHONSUS, C. S. C.

The Blue Jay shows irregularity in its distribution in winter. In the first season an approximate equality in the records of the species is shown for the different months; but in the following winter, notably in January, the number of records fell below those of the same months in the preceding year. In 1911-12 there was still greater disparity, the species approaching the high records only in December, and falling far below in January and February. That winter was very severe, which may account for the fewer records of the Jay. The following season, though not very cold, showed a still smaller number of records. The total for the four seasons was 220 records.

The Crow shows regularity of distribution in two of the winter months. In the first two seasons there was the greatest equality, there being a difference of only two records. The severe winter of 1911-12 shows 45 records for the Crow, or 19 fewer than in 1909-10. The winter of 1911-12 did not show a very great increase, the extremely small record for December bringing the total below the average of the first two seasons. The total for the four winters was 222 records, the largest number made for any species.

The White-breasted Nuthatch shows great uniformity in its records for three years. In 1910-11 the species had its largest record, which was almost double that of any other winter. February was the month that showed the least regularity in its

records—4, 7, 17, 24 being the numbers for the various seasons. This Nuthatch, among winter species, ranks third in abundance, having as a total for the four seasons 168 records.

The Snowbird was irregularly distributed, the records obtained showing a marked difference in three winters. In two seasons the species showed regularity as well as scarcity. It is impossible to determine from such inequality in the records whether the species is abundant or not in winter. Future observations may afford the writer the desired information. For the four seasons the Snowbird had a total of 60 records.

The Downy Woodpecker, from the records obtained, is shown to be somewhat rare in winter. There was uniformity in the bird's appearance, the average for each year being about 11 records. The four seasons give a total of 47 records.

The Tree Sparrow shows scarcity in its distribution in winter, 7 records being the average number of each year. The species was irregular also, as the difference of 9 days between the largest and smallest number of records shows. Further observations will likely confirm the writer in his opinion that this species is not abundant in winter. The four seasons totalled 28 records.

The appearance of the Robin in the winter of 1911-12 was unprecedented in the writer's observations. There were 20 records, and most of them were made during the coldest part of the season—from January 17 to February 11. As noted before, in a previous article, this notable event in the bird world was due to the severity of the winter, the birds migrating from the north for food and water.

The Brown Creeper may be placed among the very rare species in winter; for during the four seasons under comparison it did not appear one year, and in two other winters was seen only 5 times. In 1911-12 there were 9 records, making the total for four seasons 14 records.

Among other very rare species were: Evening Grosbeak, seen 3 times in one season; Northern Shrike, recorded twice in one winter; Hairy Woodpecker and Song Sparrow observed once in four years; Snowflake and Bluebird, each seen on 5 days in four seasons; Chickadee, found on 5 days in 1912; Goldfinch, observed twice in 1909; Screech Owl, heard 7 times in three seasons; Cardinal and Herring Gull, recorded once in the winter of 1911-12.

1909–10

	Dec.	Jan.	Feb.	Total
Blue Jay	22	27	28	77
Crow	19	22	23	64
White-breasted Nuthatch	12	11	7	30
Snowbird	11	6	2	19
Downy Woodpecker	11	3	1	15
Goldfinch	2	0	0	2
Tree Sparrow	4	2	2	8
Screech Owl	1	2	0	3
Bluebird	0	0	2	2

1910–11

	Dec.	Jan.	Feb.	Total
Blue Jay	20	17	25	62
Crow	19	23	20	62
White-breasted Nuthatch	18	21	24	63
Evening Grosbeak	2	1	0	3
Tree Sparrow	1	0	4	5
Screech Owl	1	1	0	2
Hell Diver	5	0	0	5
Snowbird	3	5	0	8
Snowflake	1	0	1	2
Downy Woodpecker	1	3	4	8
Goldfinch	0	1	0	1
Brown Creeper	0	0	1	1
Bluebird	0	0	2	2
Chickadee	0	0	2	2
Robin	0	0	2	2

1911–12

	Dec.	Jan.	Feb.	Total
Blue Jay	22	10	14	46
Crow	18	11	16	45
White-breasted Nuthatch	17	15	4	36
Downy Woodpecker	4	4	3	11
Snowbird	6	3	0	9
Tree Sparrow	2	1	9	12
Robin	1	11	8	20
Brown Creeper	8	0	1	9
Screech Owl	2	0	0	2
Song Sparrow	1	0	0	1
Cardinal	1	0	0	1
Snowflake	0	1	0	1
Sparrow Hawk	0	0	1	1

1912–13

	Dec.	Jan.	Feb	Total
Blue Jay	10	16	9	35
Crow	7	24	20	51
Song Sparrow	1	0	0	1
Chickadee	5	0	0	5
Snowbird	12	10	12	34
Downy Woodpecker	4	6	3	13
Brown Creeper	2	0	1	3
Northern Shrike	1	0	1	2
White-breasted Nuthatch	10	12	17	39
Hairy Woodpecker	0	1	0	1
Tree Sparrow	0	2	1	3
Herring Gull	0	1	0	1
Snowflake	0	0	3	3
Bluebird	0	0	1	1

Total number of species seen in four winters, 23.

NOTES ON OUR LOCAL PLANTS.—X.

BY J. A. NIEUWLAND.

Family 76. **SILIQUOSAE** Linn., Phil. Bot., 34 (1751).

Also Ray, Meth. Pl., 119 (1681), Morison, Caesalpinus, in part. *Cruciferae* B. Jussieu, Hort. Trianon, (1759), A. Jussieu, Gen. 67 (1789), DeCandolle, Syst. 11, 139 (1821), Prod. I, 131 (1824). *Cruciformes* Pontedera.

EROPHILA DC. Prod. 1, 172 (1824), Syst. II, 356 (1821). *Draba* Linn. Syst. (1735), Gen. 194 (1737), 294 (1754). *Draba* Dillenius, Gen. 122 (1719) in part. *Gansblum* Brunfels, Herb. Viv. Ic. (1531) also Adanson Fam. des Plantes, II, 420 (1763). (Name not Latin).

Erophila verna (Linn.) E. Mey., Gartenfl. Deutsch. ed. 4, 35. *Erophila vulgaris DC.* Syst. l. c., *Draba verna* Linn., Sp. Pl., 642 (1753). Common everywhere very early in spring.

TOMOSTIMA Raf., Neogenyton, 2, (1825).

Drabella Bubani Fl. Pyr., III, 197 (1901), in part, *Draba* Linn. l. c. in part. Not *Draba* Dioscorides which is *Lepidium Draba* Linn.

Tomostima caroliniana (Walt.)

Draba caroliniana Walt. Fl. Car., 174 (1788), *Draba hispidula* Michx. Fl. Bor. Am. II, 28 (1803).

Lake Co. (Hill). 1973 Notre Dame (Powers), 1972 Notre Dame. Common.

ABDRA Greene, Pittonia, IV, 205 (1900).

Draba, Linn., l. c., in part.

Abdra brachycarpa (Nutt.) Greene, l. c.

Draba brachycarpa Nuttall, T. and G., Fl. N. Am. I, 108 (1838).

Lake Co. (Hill). Found also in Laporte, Berrien and St. Joseph Co.

ADYSETON Adanson, Fam. des Plantes, II, 420 (1663). Also *Adysetum* Med., Gen. Pl., 73, t. 1, f. 16. Scop., Fl. Car., 13 (1772), Moench, Meth. Pl., 266 (1794) *Alyssum* Linn.. Sp. Pl., 650 (1753), not *Alyssum* Dioscorides which is a species of *Farsetia*. *Alyssum* Galen is *Marrubium*, *Alyssum* Pliny is *Rubia erratica*.

Adyseton alyssoides (Linn.)

Adyseton calycinum (Linn.) Scop., Fl. Car., ed. 2, II, 802 (1772), *Alyssum calycinum* Linn., Sp. Pl., II, 908 (1763), *Alyssum alyssoides* Linn. Syst. l. c. ed. 1130 (1759), *Clypeola alyssoides* Linn. Sp. Pl., 652 (1753).

9207, 9112, 9261, Webster's North of Notre Dame.

LOBULARIA Desv., Jr. Bot., III, 172(1813).

Konig Adanson Fam. Fl. II, 420 (1763) not a Latin name. *Koniga* R. Brown, App. Denh. Clapp. Narr. Exp. Afr. 214 (1826).

Lobularia maritima (Linn.) Desv. l. c. 169.

Clypeola maritima Linn., Sp. Pl., 652 (1753), *Alyssum maritimum* Lam., Encyc., I, 98 (1783), *Koniga maritima* m. Br. l. c.

THLASPI Dioscorides, 2, 147 (Ruellius' ed.) 189 (1547). *Thlaspi* Linn., Syst. (1735), Gen. 193 (1737), 292 (1754), Type of *Thlaspi* Linn. Sp. Pl., 647 (1753) *Bursa Pastoris* Tour., Els., 46 (1694) I. R. H., 185 (1700), *Bursa Pastoris* Bauhin, C., Pinax, 108 (1623), also CAPSELLA C. Bauhin, l. c. *Capsella* Med., Pfl. Gatt., I, 85 (1792), *Bursa* Heucher, Ind. Pl. Hort. Med., Acad. Vit., 14 (1711) Siegs. Pr. Fl. Petrop., 22 (1736) Guet., II, 158., *Thlaspi* Ray, I, 838. *Thlaspi* Gesner, Hort., 284 (1561). *Bursa* Trew, Herb. Blackw., Cent. I, t. 5 (1757), Ludwig-Boehmer, Def. Gen. Pl., 225 (1760), *Marsupicarpus* Necker, El. III, 91 (1790).

Thlaspi fatuum Gesner, Hort. Germ., (1561) also Ray, l. c.

Thlaspi Bursapastoris Hill, Veg. Syst. (1773), *Thlaspi Bursa pastoris* Linn., Sp. Pl., 647 (1753). *Bursa pastoris* Weber, Wigg.,

Prim. Fl. Holsat., 47 (1780), *Capsella pastoralis* Dulac Fl. Pyr., 189 (1867), *Rodschiedia Bursa pastoris* Gaertner, Mey. and Scherb., Fl. Wet., II, 413 (1800). (For other synonyms see Am. Mid. Nat., II, 113).

531 South Bend, Ind.; 1197 Notre Dame, Ind. Common everywhere. Lake Maxinkuckee (H. W. Clarke).

CARDAMINE Dioscorides II : 120.

Nasturtium R. Brown, Ait. Nort. Kew., ed. 2, 109 (1812) in part. *Nasturtium* Pliny 20 : 13, Varro III : 9, Pall., Jan. 14, is *Lepidium sativum* Linn. (?).

Radicula Dillenius, Pl. Giss., 80 (1718) also J. Bauhin, Hist. II, 866, J. Hill, Br. Herb., 265 (1756), *Roripa* Scopoli, Fl. Car., 520 (1760), *Sisymbrium* Dioscorides (Doubtful, thought to be a mint by some) *Cardaminum* Moench Meth, 262 (1794). Also Ruellius *Sisymbrium* Linn., Syst., Gen., 199 (1737), 296 (1754) also Tour., Els., 192 (1694), I. R. H., 215 (1700). *Vella* Galen, *Cresso* Ericius Cordus.

Cardamine aquatica (Hill).

Sisymbrium Nasturtium aquaticum Linn., Sp. Pl., 657 (1753), *Sisymbrium aquaticum* Tour., l. c. *Nasturtium aquaticum* Hill, 1755, also *Sisymbrium vulgare* Br. Herbal, 245 (1756). *Nasturtium officinale* R. Br., Ait. Hort. Kew., ed. 2, IV, 110 (1812). For other synonyms see Am. Mid. Nat., II, 112. *Sisymbrium aquaticum* Matthli, Caesalpinus, Castor Durante, Tabernaemontanus also Tour., Els., 192 (1694) I. R. H., 226 (1700).

South Haven (J. H. Bailey), Laporte Co., (Deam) St. Joseph Co., Ind., Rothert, Lake Maxinkuckee (Clarke), 5691½, 2018, 3523, Notre Dame (Powers) 10433, 11189 Notre Dame, 10481 Bertrand, Berrien Co., Mich. Very common and abundant. Not cultivated as in the East, for table use. I have seen it in all the counties.

Roripa Scopoli Fl. Car., 520 (1760).

Radicula Dodonaeus Pempt., 666 (1583) = *Raphanus*. *Radicula* Dillenius Cat., Pl. Giss., 80 (1718) in part, Hill, Br. Herbal 265 (1756). *Nasturtium* R. Br. l. c. in part.

Roripa palustris Bess., Enum., 27 (1821).

Radicula palustris (Linn.) Moench, Meth., 263 (1794) *Sisymbrium amphibium* var. *palustre* Linn., Sp. Pl. 657 (1753), *Nasturtium terestre* R. Br. l. c., *Nasturtium palustre* DC., Syst., II, 191 (1821).

Lake Maxinkuckee (H. W. Clarke), 11310 South Bend, Ind., on the Grand Trunk R. R. towards Crumstown. Common in muck ground in the region.

Roripa hispida Britton Mem. Tor. Bot. Cl., V. 169 (1894).

Radicula hispida (Desv.) Britton Torreya, VI, 32 (1908). *Brachylobus hispidus* Desv., Jour. Bot. III, 183 (1814), *Nasturtium hispidum* DC., l. c. 201, *Nasturtium palustre* var. *hispidum* A. Gray, Man., ed. 2, 30 (1856).

Lake Co., (Deam).

ARMORACIA Pliny XIX:5.

Also Columella, Lacuna, *Armoracia* Heucher, 13 Weinm., 79, t. 170, fig. a. also Rivinus, Ruppius Fl. Jen., 67 (1726), 87 (1745), *Cochlearia* Tour., Els., 183 (1694) I. R. H., 215 (1700) in part also Linn., in part. *Armoracia* Gaertn. Meyer and Schred. Fl. Wett., II, 426 (1800).

Armoracia Rivini Ruppius l. c.

Armoracia rusticana Gaertn. l. c., *Raphanus rusticanus* Camerarius, Gerard C. Bauhin Stapelius, Ray, Plukenett, Morison, *Raphanus rusticus* Camerarius *Raphanus major* Brunfels, Tragus, Gesner.

Escaped extensively and notably at Lakeville.

NEOBECKIA Greene, Pittonia, III, 95 (1896).

Neobeckia aquatica (Eaton) Greene, l. c.

Cochlearia aquatica Eaton Man., ed. 5, 181 (1829), *Nasturtium natans* var. *americana* A. Gray Ann. Lyc. N. U. III, 223 (1836), *Nasturtium lacustre* A. Gray Gen. III., I, 132 (1448), *Roripa americana* Britton, Mem. Torr. Bot. Cl., V, 169, (1894). *Radicula aquatica* Robinson Rhodora X, 32 (1909).

ADYSETON Adanson Fam. des Pl., 420 (1763).

Adyseton Scopoli Fl. Car. 13, (1772), Medik., Gen. Pl., 73, t. 1, f. 116, Moench, Meth., 266 (1794). *Allyssum* Linn., Tour, not *Allyssum* Dioscorides = *Farsetia* sp. nor *Alyssum* Galen = *Marrubium* nor *Alyssum* Pliny = *Rubia erratica.*

Adyssetum allyssoides (Linn.)

Allyssum allyssoides Linn. Syst., Ed. 10, 1130 (1759), *Clypeola alyssoides. Alyssum calycinum* Linn., Sp. Pl., 908 (1763).

9207, 9090, 9261, Webster's N. of Notre Dame. Found also at Notre Dame in dry uncultivated fields.

LOBULARIA Desv., Jr. Bot., 172 (1813).

Koniga R. Br., Denh. and Clapp. Narr. Exp. Afr., 214 (1826),

Konig Adanson, Fam. des Pl., 11420 (1763) not a latin name.

Lobularia maritima (Linn.) Desv. l. c. 169.

Clypeola maritima Linn. Sp. Pl., 652 (1753), *Alyssum maritimum* Lam. Encyc. I, 98 (1783), *Koniga maritima* R. Br. l. c.

Escaped from gardens and sometimes persisting a while.

LEPIDIUM Dioscorides, II:166, Pliny, XX:17.

Draba Dioscorides = *Lepidium Draba*. *Cardamon* Dioscorides = *Lepidium sativum*, *Piperitis* Brunfels, Lonicer, Dodonaeus, French ed. (1557). *Lepidium* Tour., Els., 184 (1694), I. R. H., 215 (1700), *Lepidium* Linn. Syst. (1735) Gen. 192 (1737), 291 (1754), also *Lepidium* Anguillara, Matthioli, Caesalpinus, Gesner, Tabernaemontanus, Lacuna, Dodonaeus, Lobelius, Gerard, Fuchs, Tragus, Cameratius, etc.

Lepidium virginicum Linn., Sp. Pl., 645 (1753).

Lake Maxinkuckee (H. W. Clarke), 3567, 3569 Notre Dame (Powers) 2050, 3721 Notre Dame. Common everywhere.

Lepidium densiflorum Schrader, Ind. Sem. Gott., 4 (1835). *Lepidium intermedium* A. Gray, Man. ed. 2, (1856).

9650, Oliver's, St. Joseph Co., 10633 Notre Dame.

Lepidium campestre R. Br., Ait., Hort. Kew., ed. 2, IV, 88 (1812).

456 M. C. R. R., near Notre Dame, 6217 (Tidestrom) Notre Dame 10542, 9137 South Bend.

CAMELINA Ruellius, Nat. Stirp., 326 (1543).

Camelina Crantz Stirp. Aust., I, 18, (1762), *Dorella* Caesalpinus, De Plant. 367 (1583), *Linostrophon* Schrank, Fl. Prim. Salisb. 163 (1792). *Myagrum* Diosc?

Camelina sativa Schrank, l. c.

Myagrum sativum Linn., Sp. Pl., 641 (1753), *Linostrophon sativum* Schrank l. c. *Dorella oleifera* Bubani, Fl. Pyr., III, 252 (1901).

Lake Maxinkuckee (Clarke).

SOPHIA Brunfels, Hist., 3, 170 (1543) Lobelius, Icon., 738 (1581).

Also Ray, Hist., I, 812, (1686), *Sophia* Dodonaeus, Pempt., 133 (1583), Weinm., Phyt., t. 941, a. (1737) Heist., Ind., 130. Zannich., 252, Ic. 350. Haller, *Accipitrina* Rivinus, Lonicer, Ruppius, Fl. Jen., 64 (1726), 81 (1745), *Seriphium* Fuchs, J. Bauhin, Tragus, Chabraeus etc. *Descurea* Guettaro, Obs., 2, op. 164. Stamp., 2, 164 (1747), *Descuraniia* Webb., and Barth., Phyt.

Can., I, 71 (1836) *Sophia* Trew, Herb. Blackw., t. 440 (1755) also Adanson, Fam. des Pl., II, 417 (1763) *Sisymbrium* Tour. I. R. H., 226 (1700), 192 (1694), Linn. Syst., (3735) Gen. 199 (1737) 296 (1754).

Sophia pinnata (Walt.) Howell, Fl. N. W. Am., I, 56 (1897).

Erysiumm pinnatum Walter, Fl. Car., 174 (1788), *Sisymbrium canescens* Nutt., Gen., II, 68 (1818), *Descurainia pinnata* Britton, Mem. Torr. Bot. Cl., V, 173 (1894.

Millers (Higdon and Raddin), Hegewisch, Ind. (Hill), 3525 Notre Dame (Powers) 2068, 2069 St. Mary's, Notre Dame. Found also in a number of other places in this country.

NORTA Adanson, Fam. des Pl., II, 417 (1763).

Norta altissima (Linn.) Britton, Ill. Fl., 2 ed., II, (1913).

Sisymbrium altissimum Linn., Sp. Pl., 659 (1753).

11094, 11248 Notre Dame, Ind., 2680a, 2680b Galien, Mich., Berrien Co., Millers (Umbach).

CHEIRINIA Link, Enum. Hort. Berol., II, 170 (1820).

Cheirinia cheiranthoides (Linn.) Link, l. c.

Erysimum cheiranthoides Linn., Sp. Pl., 661 (1763).

11311, Grand Trunk w. w. west of South Bend, Ind.

ERYSIMUM Dioscorides, II :187, also Pliny, Hist. Nat.

Not *Erysimum*[1] Theophrastus = *Polygonum Fagopyrum* Linn. *Sisymbrium* of modern works, not *Sisymbrium* of the ancients, and Dioscorides which is a mint, probably *Mentha arvensis* Linn.

Chamaeplium Spach, ex Wallr., Sched. Crit. I, 176 (1827), *Phrye* Bubani Fl. Pyr., III. 171 (1901). *Erysimum* Linn., Syst. (1735), Gen. 198 (1737), 296 (1754) Tour. Els. 194 (1694), I. R. H. 228 (1700). also Gesner, Dodonaeus, Gerard, Thalius. Tragus, Morison, Boerhaave, etc. *Irio* Dodonaeus, Hist. ed. Gall. 438 (1557).

[1]Bubani does not think that the *Erysimum* of Dioscorides is indubitably the *Erysimum officinale* of Linnaeus (Fl. Pyr. III, 179). Fraas in his Flora Classica to another species of the genus refers the Dioscorean name. Sibthorp (Fl. Graec) refers the *Erysimum* in question to *Sisymbrium polyceratium* Linn. The consensus of the older pre-Linnaean is so general that even Bubani admits that the plant of Dioscorides is probably *E. officinale* Linn. though he himself changed the name to *Phryne* not wishing to accept only probable ancient names. We do not see sufficient reason for any other view and have retained *Erysimum* though there was another Theophrastan one. Our reasons for this were explained in the introduction to these notes.

Erysimum vulgare Bauhin, Pinax, 100 (1623).

Erysimum vulgare Morison, Hist. II, 218, Boerhaave, Lg d., II, 14. Tour., l. c. *Erysimum officinale* Linn., Sp. Pl., 660 (1753), *Sisymbrium officinale* Scop. Fl. Car., ed. 2, II, 26 (1772), *Klukia officinalis* Andrz. ex DC. Syst., II, 460 (1821). *Erysimum vulgatum* C. Bauhin, Phytopinax, 152 (1596).

Lake Maxinkuckee (Clarke). A common weed seen throughout the whole region.

HESPERIS Pliny, XXI:7.

Hesperis Clusius, Camerarius, C. Bauhin, Pinax, 202 (1623). Tour. Els. 190 (1694) I. R. H., 222 (1700), Linn., Syst., (1735), Gen. 195 (1737), 297 (1754). *Deilosma* Andrz., DC., Syst., II, 448 (1813), *Antoniana* Bubani, l. c. 170.

Hesperis hortensis C. Bauhin, Pinax, 202, (1623) also Phytopinax 379 (1596).

Hesperis hortensis Tour., l. c. Morison, Ray, Magnol. etc. *Hesperis vulgaris* Parkinson, Parad., 163 (1629), *Deilosma inodora* Andrz., l. c. *Hesperis euganea* Marsil., ex Ten. Prod. Fl. Nap. p. 39. *Hesperis matronalis* Linn., Sp. Pl., 663 (1753). *Hesperis matronalis* Chabraeus, Sciag., 280 (1677) and Index.

11122, Notre Dame, Ind. Escaped along the banks of the St. Joseph River from the St. Mary's Academy Gardens. The white flowered variety as also the common purple flowered plant is found in great abundance in the low land south of Buchanon, Mich. (Berrien Co.)

Arabidopsis (DC) Schur., Enum. Pl. Trans., 55 (1866).

Pilosella Thalius, Fl. Herc., 84 (1588) not *Pilosella* of the older authors Dodonaeus etc., nor *Pilosella* Thalius, l. c. 83 (1588), *Stenophragma* Celak., Flora. IV., 438 (1872).

Arabidopsis thaliana (Linn.) Schur l. c.

Arabis thaliana[2] Linn., Sp. Pl., (1753), *Sisymbrium thalianum*

[2]It is incorrect to write the second name *thaliana* with a capital letter. Linnaeus used such capital letters for the trivial names of old genera reduced by him form their original standing. Thus, *e. g. Erysimum Barbarea* meaning the *Erysimum* that formerly constituted the genus *Barbarea*. There is no record of any application of a genus *Thaliana*. Moreover even Linnaeus does not write the name *Arabis Thaliana* as the manual makers would have us believe but *Arabis thaliana* Linn. Sp. Pl., l. c. It is therefore, a falsehood to attribute the name to him, but such things are frequently done and often with questionable motives. (See Am. Mid. Nat., II., 97) (Britton and Brown Flora III., II., 197 [1913]). The plant was so named in honor of Thalius who first described it. (l. c.)

Gray, Ann. Sci. Nat., VII, 399 (1826), *Stenophragma thaliana* (?) Celakowski, Oester, Bot. Zeitsch., XXVII, 177 (1877) *Pilosella siliquata* Thalius, l. c. also Camerarius. *Pilosella siliquosa* Chab., Sciagr., 277, f. 4 (1677).

9114, 9129, 11076, 1175, 11757, 11023, 2538, 2545, Notre Dame, Ind., 3520, 2049 Notre Dame, (Powers).

BARBAREA Dodonaeus, Pempt., 5:4:20 (1583) also Lobelius Obs., 104 (1576).

Barbarea R. Br., Ait. Hort. Kew., 2 ed. 4, 109 (1812). Reduced by Linnaeus to *Erysimum* (*Herba S. Barbarae* Lon., Cast. Fuchs, Gesner) *Scopa regia* Fuchs, Ang.

Barbarea vulgaris R. Br., l. c.

South Haven, Berrien Co. (Bailey), 27, Bertrand, Mich. 2198 Notre Dame.

Barbarea stricta Andrz. Bess., Enum. Pl. Volh., 72 (1821). *Barbarea vulgaris* var. *stricta* A. Gray, Man. ed. 2, 35 (1856) Notre Dame, Ind.

TURRITIS Lobelius, Icones, (1591) also Dillenius, Gen., 120 (1719) Linn. Syst. (1735) *Arabidium* Spach. Hist. Nat. Veg. VI, 436 (1836). *Turritis* and *Arabis* Linn., Gen. 198 (1737), 298 (1754). *Arabis* Linn., Sp. Pl., 664 and *Turritis* Linn., l. c. 666 (1753), *Turrita* and *Turritis* Bubani, l. c., 152. The *Arabis* of the pre-Dillenian and pre-Linnaean writers, and the first to use the name *e. g.* Matthioli and Anguillara, was *Lepidium Draba* Linn

Turritis spathulata (Michx.)

Arabis lyrata Linn., Sp. Pl., 665 (1753), not *Turritis lyrata* Raf., Am. Month. Mag. II, 44 (1817), = *Arabis canadensis* Linn.

Laporte Co. (Barnes) (Deam), Lake Co. (Barnes ,Deam and Hill), South Haven (Bailey) 443, 20401, Notre Dame, Ind.

Turritis hirsuta Linn., Sp. Pl., 666 (1753).

Arabis hirsuta (Linn.) Scop., Fl. Car., ed. 2, II, 30 (1772).

9233, 2792, Notre Dame, 2027, 2010 Notre Dame (Powers).

Turritis laevigata Muhl., ex Willd., Sp. Pl., III, 543 (1800).

Arabis laevigata Poir., Lam. encyc., Suppl., I, 411 (1810).

405, 2526, 2551, 1839, Notre Dame, 2028 Notre Dame (Powers) Lake Maxinkuckee (Clarke).

Turritis canadensis (Linn.)

Arabis canadensis Linn., Sp. Pl., 665 (1753).

Lake Co. (Hill), Lake Maxinkuckee (Clarke). 2029 Notre Dame (Powers), 11360 Notre Dame, Ind.

Turritis stricta Graham, Edinb. New Phil. Jr., 350 (1829). *Arabis Drummondii*A. Gray, Proc. Am. Acad., VI., 187 (1866). 9253, 11069 Notre Dame, Ind.

Turritis brachycarpa T. and G., Fl. N. Am. I, 79 (1838). *Arabis brachycarpa* (T. and G.)Britton, Mem. Torr. Bot Cl., V. 174 (1894).

405 Notre Dame, Ind.

DRACAMINE Nwd., Nom. Nov.

Cardamine Clusius, Haller, Lobellius, Gerard, Linnaeus, Syst (1735), Gen., 196 (1737), 295 (1754), Tour., Els., 191 (1694), I. R. H., 224 (1700), not *Cardamine* Dioscorides, which is *Sisymbrium Nasturtium aquaticum* Linn. *Ghinia* Bubani l. c. 158, not *Ghinia* Schreb., Gen. 19 (1789).

Dracamine pennsylvanica (Muhl.)

Cardamine pennsylvanica· Muhl., Willd., Sp. Pl., III, 486 (1800).

2001, 2002, Notre Dame (Powers), Lake Maxinkuckee (Clarke), 483, Edwardsburg, Mich., 525 South Bend, Ind., 9111 Websters N. of Notre Dame. Van Buren Co. Mich. (Pepoon).

Dracamine pratensis (Linn.)

Cardamine pratensis Linn., l. c. 656 (1753), *Ghinia pratensis* Bubani, l. c. 163.

Lake Co. (Hill), Millers (Bastin and Hill), Lake Maxinkuckee (Clarke).

Dracamine purpurea (Torr.)

Cardamine purpurea (Torr.) Britton in Britton and Brown, III. Fl., II, 139, (1897), *Arabis rhomboidea* var. *purpurea* Torr., Am. Jr. Sc., IV., 66 (1822), *Arabis Douglassii* Torr., T. and G., Fl. N. Am., I, 83 (1839), *Cardamine Douglassii* Britton, Trans. N. Y. Acad., Sc IX, 8 (1889).

Laporte Co. (Deam), St. Joseph Co. (Rothert), 2010 Notre Dame (Powers), 1999, 1836, 11105, 11161, Notre Dame, 9382, 9218 Benton Harbor, Mich.

Dracamine bulbosa (Schred.)

Cardamine bulbosa Schreber, Muhl. Trans. Am. Phil. Soc. III, 174 (1793), *Cardmine rhomboidea* DC., Syst. Veg., II, 246 (1821).

Clarke, Ind., Lake Co., (Umbach), Lake Maxinkuckee (Clarke),. Very common and abundanr throughout the region as is the preceding plant.

(To be continued.)

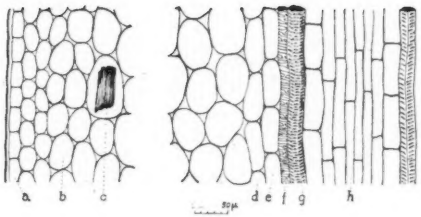

Fig. 18

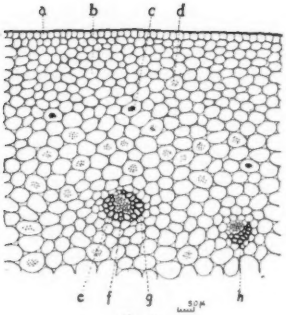

Fig. 19

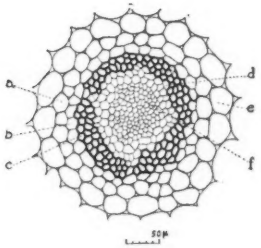

Fig. 20

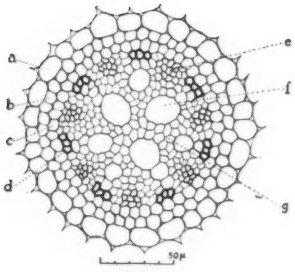

Fig 22

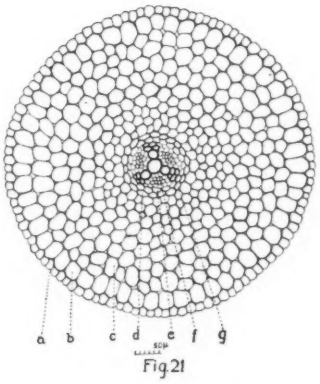

Fig. 21

PLATE III. VOGT ON POLYGONATUM COMMUTATUM.